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THE LIMITS TO THE SMOOTHNESS OF SOLID HYDROGEN-ISOTOPE SURFACES

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Experiments on the surface morphologies of solid hydrogen isotopes and their mixtures, both in flat and curved geometries, have shown that a residual roughness always remains, no matter what the smoothing technique. This is true for beta-layering, infrared, and joule heating. A fairly simple model based upon minimizing the thermal energy plus the surface energy of the solid explains this residual roughness. With reasonable choices for some unknown or distributed solid parameters, such as surface energies and their anisotropies, the model gives results consistent with observations. It predicts temperature dependencies of the roughness, and in the case of beta-layering, the dependence on tritium concentration.

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